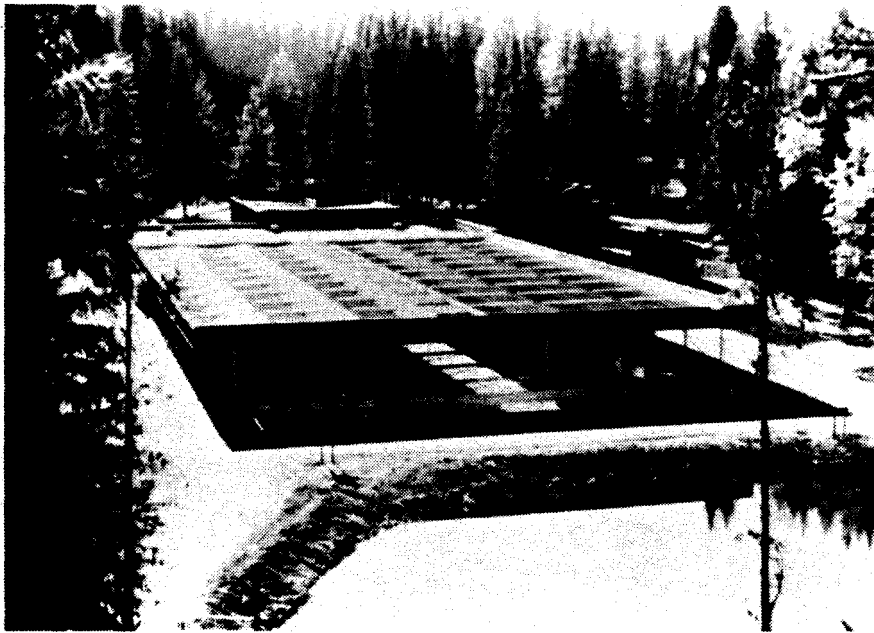




McCALL HATCHERY Annual Report

October 1, 1985 to September 30, 1986



by
Christopher J. Starr
Hatchery Superintendent I

October 1988

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ABSTRACT

The McCall Hatchery was constructed in 1979 as part of the Lower Snake River Compensation Plan. The principal purpose of this hatchery is to produce summer chinook salmon, but the McCall Hatchery is also used for a resident fish program. Objectives of the program include: (1) operating a westslope cutthroat trout spawning station, (2) hatching and rearing 1,000,000 trout fry for stocking, and (3) redistribution of approximately 35,000 pounds of catchable size rainbow trout.

A culling process was begun at Fish Lake (the westslope cutthroat trout spawning station) to remove those fish clearly exhibiting rainbow trout characteristics. Eggs and culls from westslope cutthroat trout were taken and incubated separately. Fish were reared in separate lots to ensure enough fry to meet 1986 stocking allocations. A total of 323,178 green eggs were taken at Fish Lake in 1986. The average fecundity rate was 349.8 eggs per female.

McCall Hatchery reared three species in 1986: rainbow trout, westslope cutthroat trout, and Henrys Lake cutthroat trout. A total of 883.9 pounds of fish feed was used by the resident fish program during Fish Year 1986. The overall feed conversion was 1.08.

The McCall Hatchery planted 230,884 trout fry in lowland reservoirs in 1986. All fry allocations were met except for Deadwood Reservoir, which fell 46,834 shy of the requested 200,000 unspecified cutthroat trout.

The McCall Hatchery planted approximately 124,250 grayling, westslope cutthroat trout, and rainbow trout (weighing 98.04 pounds) in 115 mountain lakes in 1986.

Forty-four streams, lakes, and reservoirs were stocked with 139,587 catchable size rainbow trout weighing 39,494 pounds during 1986. Catchable size rainbow trout were received from the American Falls and Grace hatcheries.

Author:

Christopher J. Starr
Hatchery Superintendent I

INTRODUCTION

The McCall Hatchery was constructed in 1979 by the Army Corps of Engineers as part of the Lower Snake River Compensation Plan authorized by Congress to compensate for losses in the summer chinook salmon run caused by the lower Snake River dams (Ice Harbor, Lower Monumental, Little Goose, and Lower Granite). The principal purpose of this hatchery is to produce summer chinook salmon, but the McCall Hatchery is also used for a resident fish program. Funding is provided by Idaho Department of Fish and Game for the resident fish program during the period April 1 through September 30. Funds are also provided for a Fish Hatchery Superintendent I stationed at McCall Hatchery to supervise this program.

McCall Hatchery is located along the North Fork of the Payette River approximately one-fourth mile below Payette Lake in the city of McCall, Idaho (Appendix A). Hatchery water is obtained from Payette Lake via a 36-in. diameter underground pipeline. Water inlets at the surface (at a depth of 50 ft.) provide the capability of obtaining the best water temperature available (Appendix B). The hatchery requires a flow of 20 cfs for normal operations.

OBJECTIVES

The Idaho Department of Fish and Game funds a resident fish program at the McCall Hatchery from April 1 through September 30. The objectives of the program are to:

1. Operate and maintain a fish trap at Fish Lake for the purpose of obtaining westslope cutthroat trout eggs.
2. Hatch and rear approximately 1,000,000 trout fry for stocking in state waters and for redistribution to other hatcheries.
3. Redistribute approximately 35,000 pounds of catchable size rainbow trout reared at other state hatcheries into waters in Regions 2 and 3.

FISH LAKE SPAWNING OPERATION

Methods

McCall Hatchery operates and maintains a trapping and holding facility at Fish Lake for spawning westslope cutthroat trout. The facility consists of a velocity barrier, fish ladder and trap, 2 holding ponds, and a spawning platform. Fish Lake is located approximately 6 miles west of the McCall Hatchery and is owned by the Idaho Department of Fish and Game. The trap and holding facility located on Fish Lake is on land owned by Boise Cascade Corporation.

The trap was installed on March 11, 1986; and a bio-aide was stationed at the site on April 3, 1986. The first day of spawning was April 18, while the last spawn take occurred May 22, 1986. The trap was removed on May 22, 1986. After the fish were sorted for ripeness, they were anesthetized before they were spawned. Eggs were fertilized using the dry fertilization method.

Genetics

For the past few years, there has been a question about the genetic purity of the westslope cutthroat trout broodstock present in Fish Lake. As early as 1982, fish began showing up in the trap that appeared to exhibit rainbow trout characteristics. In the spring of 1986, progeny from the Fish Lake broodstock were electrophoretically tested for genetic purity by Robb Leary at the University of Montana. The results indicate that the percentage of westslope cutthroat trout genetic material averaged over the 6 diagnostic loci examined in the Fish Lake broodstock is 98.0 (+ 1.1).

After reviewing the report along with discussing the concern with various biologists, it was decided to attempt to control future dilution on the gene pool. Until 1986, those fish trapped that clearly exhibited rainbow trout characteristics were not spawned or put back into the drainage. In 1986, fish exhibiting rainbow trout characteristics were spawned separately and were planted in Lost Valley Reservoir, thus eliminating them from the drainage along with providing a benefit to the angling public. The eggs taken from these culls were incubated, and the fish were reared separately at the McCall Hatchery and planted in waters requesting unspecified cutthroat as the species of choice.

Characteristics that were examined to determine whether a fish should be culled were: spotting pattern, coloration of the slashes, general body coloration, and scale size. To be consistent, only management staff of the McCall Hatchery decided which fish were to be culled. By no means was this type of visual culling intended to correct the concern over genetic purity in the Fish Lake broodstock. It is felt, however, that it may be used as a tool to remove those fish that are most likely to further decrease the genetic purity of the Fish Lake broodstock. Until a source of genetically pure westslope cutthroat can be crossbred with the Fish Lake broodstock, visual culling may be the best alternative.

Population Size

Another concern at Fish Lake is that it may be overpopulated. Currently, work is being done to determine population size, carrying capacity, and stocking rates for Fish Lake. It was felt that culling fish 15 in. and larger would be beneficial to the rest of the population due to the lower fecundity rates of the older brood fish. These fish were also examined for rainbow trout characteristics and spawned appropriately. As with the other culls, these fish were held separately until they were planted in Lost Valley Reservoir.

A total of 269 fish were culled from the population: 240 due to rainbow trout characteristics and 29 due to length (Table 1).

Table 1. A summary of numbers culled due to rainbow trout characteristics and due to length at the Fish Lake spawning station in 1986.

	Females	Males
No. culled for rainbow trout characteristics	136	104
No. culled for length (> 15 in.)	<u>29</u>	<u>0</u>
TOTALS	151	104
Total culls	269	
Culls pathologically sampled	60	
Total culls planted	209	

There were 104 males and 265 females culled. Only 29 females were culled for length. Sixty culls were sacrificed for pathological sampling, and 209 culls were planted in Lost Valley Reservoir.

The average length of fish culled for rainbow trout characteristics was 12.09 in., while those culled for length averaged 17.0 in.. Approximately 10.81 of culled fish were culled for length.

Numbers

A total of 2,091 fish were reported trapped. They were sexed and placed in the appropriate holding pond until they became ripe. There were 774 female westslope cutthroat trout spawned (Table 2). Females spawned as culls numbered 151.

Table 2. A summary of fish spawned at Fish Lake in 1986, including number spawned, female to male ratio, eggs taken, and eggs per female.

	Westslope cutthroat trout		Westslope cutthroat trout culls		Combined total	
	Females	Males	Females	Males	Females	Males
No. spawned	774	365	151	104	925	469
Ratio (F:M)	2.12:1		1.54:1		1.97:1	
No. eggs taken	276,340		46,838		323,178	
Eggs per female	357.0		310.2		349.8	

The egg take for westslope cutthroat trout was 276,340, and 46,838 eggs were taken from fish spawned as culls. Fecundity rates averaged 357.0 per female and 310.2 eggs per female for westslope cutthroat trout and westslope cutthroat trout culls, respectively.

After spawning, female westslope cutthroat trout were released back into the western end of the lake. These fish were opercle punched so they would not be recounted if they entered the trap again. All male westslope cutthroat trout were held in the holding pond until the last day of spawning, at which time they were released back into the lake.

The average length of females spawned was 12.34 in., and the average length of the males spawned was 12.21 in. (Appendix C). The largest fish spawned was a female measuring 18.5 in. long.

Throughout the trapping season, a total of 71 mortalities were encountered. At the time of trap dewatering, 25 fish were found in the trap, and these fish were released below the velocity barrier.

There were 4 westslope cutthroat trout females with no eggs and 6 westslope cutthroat trout culls with no eggs.

Miscellaneous

No fish were released above the velocity barrier into Fish Lake Creek, thus eliminating any natural reproduction. This will allow better control over a population that is on the verge of overpopulation. Scales were collected from fish of various sizes for future age structure work.

McCall Hatchery personnel, with the aid of the regional biologist, began working on a long-term management plan for the Fish Lake broodstock. Work included population estimates, development of a carrying capacity for the lake, and an estimation of annual stocking rates to promote a healthy population with higher fecundity rates.

Pathological work was also conducted on a sample taken from the broodstock. Bacterial and virological assays were negative in 1986.

PRODUCTION

Methods

Fish rearing facilities at the McCall Hatchery include 26 eight-tray stacks of Heath incubators, 14 indoor concrete vats (4 ft. x 40 ft.), and 2 outdoor concrete rearing ponds (42 ft. x 200 ft.). Trout eggs are hatched in the incubators and transferred to the vats at the swim-up stage. No trout are reared in the outside rearing ponds because these are used exclusively for the summer chinook salmon.

Rainbow Trout

Eggs

During May of 1986, 119,190 eyed rainbow trout eggs were received from the Mt. Lassen Trout Farm in California (Table 3). A total of 98,812 swim-up fry were ponded, producing an 82.902 survival rate from the eyed egg stage to the swim-up stage.

Table 3. A summary of trout eggs received and egg survival at the McCall Hatchery in 1986.

	Westslope cutthroat trout	Westslope cutthroat trout culls	Henry's Lake cutthroat trout	Rainbow trout
Date received	Apr/May '86	Apr/May '86	May 1986	May 1986
No. green eggs	276,338	46,836	-	-
Percent survival (green to eyed egg)	72.87	85.32	-	-
Number eyed eggs	201,371	39,959	300,060	119,190
Egg pick-off (eyed egg to ponding)	2,675	2,675	26,500	8,400
Unaccountable loss (eyed egg to ponding)	19,280	1,025	7,978	11,978
Percent survival (eyed egg to ponding)	89.10	90.74	88.51	82.90
Swim-up fry ponded (eyed egg to ponding)	179,416	36,259	265,582	98,812
Percent survival (green egg to ponding)	64.93	77.42		

Growth

Rainbow trout fry were fed 294.5 pounds of feed to produce 304.8 pounds of weight gain (Table 4). Feed conversion was 0.97.

At a cost of \$0.5431 per pound of feed, cost of feed for the rainbow trout was \$159.94. The feed cost per pound of weight gain was \$0.5247.

Table 4. A summary of feed utilization, including cost per pound of weight gained, by resident fish reared at the McCall Hatchery in 1986.

	Westslope cutthroat trout	Westslope cutthroat trout culls	Henry's Lake cutthroat trout	Rainbow trout
Pounds of feed	143.20	50.90	358.80	294.50
Pounds weight gained	115.58	49.24	340.88	304.80
Feed conversion	1.24	1.26	1.05	0.97
Feed cost per pound of weight gain	\$0.6729	\$0.6869	\$0.5489	\$0.5247

Fish Health

Rainbow trout at the McCall Hatchery experienced no fish health problems during 1986. A 13.87% mortality rate produced a total of 13,704 mortalities (Table 5).

Table 5. Mortality in resident fish at the McCall Hatchery during 1986.

	Westslope cutthroat trout	Westslope cutthroat trout culls	Henry's Lake cutthroat trout	Rainbow trout
Swim-up fry ponded	179,416	36,259	265,582	98,812
Known mortality	19,749	5,297	47,822	13,704
while ponded				
Unaccountable mortality	9,449	761	59,813	-
while ponded				
Percent mortality	16.27	16.71	40.53	13.87
while ponded				
Number shipped	142,968	30,201	157,947	85,108
(planted or transferred)	(7,250) ^a			

^aHolding for Fish Lake broodstock. Will plant in October 1986.

HENRYS LAKE CUTTHROAT TROUT

Eggs

In May 1986, 300,060 Henrys Lake cutthroat trout eggs were shipped to the McCall Hatchery (Table 3). A total of 265,582 swim-up fry were ponded producing an 88.51% survival rate from the eyed egg stage to the swim-up stage. The number ponded was probably less than reported due to problems encountered when the incubation trays were inadvertently overloaded. Upon noticing alarming egg mortalities in the bottom incubation trays, the eggs were split into 2 groups and placed into a rearing vat upon hatching. This may partially account for the higher-than-normal unaccountable loss in the Henrys Lake cutthroat trout.

Growth

A weight gain of 340.90 pounds was achieved by feeding 358.82 pounds of fish feed to the Henrys Lake cutthroat trout (Table 4). Feed conversion was 1.05. The feed cost was \$187.07 producing a feed cost per pound of weight gain of \$0.5489.

Fish_Health

During 1986, the Henrys Lake cutthroat trout experienced a bacterial infection shortly after ponding. After confirmation by an Idaho Department of Fish and Game pathologist, a 14-day treatment of TM-50 was administered which reduced the mortality to acceptable levels. Total mortality from swim-up to planting was 107,635 fish, or 40.531 (Table 5). The majority of the mortality was an unaccountable loss due partially to underestimating the mortality during the disease episode.

Westslope Cutthroat Trout

Eggs

The Fish Lake spawning operation produced 276,338 green westslope cutthroat trout eggs (Table 3). Survival to the eyed egg stage was 72.871, leaving 201,371 eyed eggs. An 89.102 survival rate was achieved from the eyed egg stage to the swim-up stage.

Growth

A total of 143.20 pounds of fish feed produced 115.58 pounds of weight gain in the westslope cutthroat trout (Table 4). A 1.24 feed conversion was experienced. Feed cost for the westslope cutthroat trout was \$91.02, producing a feed cost per pound of weight gain of \$0.6729.

In October 1985, the McCall Hatchery planted 10,209 westslope cutthroat trout weighing 65.9 pounds in Fish Lake to perpetuate the broodstock. While at the hatchery, these fish used 36.5 pounds of feed to produce 13.5 pounds of weight gain during October 1985. The resulting feed conversion was 2.7.

Fish Health

Although a considerable amount of pinheads were lost after ponding, no fish health problems were diagnosed in the westslope cutthroat trout. After ponding, the survival rate was 83.732. Total mortality was 29,198 fish (Table 5).

Westslope Cutthroat Trout Culls

Eggs

A total of 46,836 green westslope cutthroat trout cull eggs were taken at the Fish Lake spawning station (Table 3). Survival to the eyed egg stage was 85.32%. A 90.742 survival rate of 39,959 eyed eggs produced 36,259 swim-up fry at the time of ponding.

Growth

The westslope cutthroat trout culls had a feed conversion of 1.26 (Table 4). Total weight gain was 40.24 pounds from 50.90 pounds of fish feed. Feed cost for the westslope cutthroat trout culls was \$27.64. The feed cost per pound of weight gain was \$0.6869.

Fish Health

No fish health problems were experienced by the westslope cutthroat trout culls. Mortality from ponding to planting was 6,058 fish or 16.71% (Table 5).

FISH FEED UTILIZATION

A total of 883.9 pounds of fish feed costing \$464.50 was used at the McCall Hatchery during Fish Year 1986 (Appendix D). Overall feed conversion was 1.08.

FISH TRANSFERS

During 1986, the McCall Hatchery received 148,495 catchable size rainbow trout weighing 42,775 pounds from the American Falls and Grace hatcheries (see Catchables section). Grayling were received from the Ashton Hatchery for stocking in mountain lakes. They numbered 11,000 fish and weighed 2.30 pounds.

The McCall Hatchery transferred 9,982 Henrys Lake cutthroat trout weighing 23.69 pounds to the Mackay Hatchery along with 10,010 rainbow trout weighing 13.91 pounds. The Nampa Hatchery received 49,718 rainbow trout weighing 60.75 pounds.

FRY PLANTS

The McCall Hatchery planted lowland lakes and reservoirs with trout fry during 1986 (Appendix E). A total of 230,884 fry weighing 486.28 pounds was stocked in these waters. With the exception of Deadwood Reservoir, all the requests for stocking of trout fry were met in 1986. Deadwood Reservoir received 153,166 cutthroat trout fry, 46,834 shy of the request.

In October 1985, the McCall Hatchery planted 10,209 westslope cutthroat trout fry weighing 65.9 pounds in Fish Lake to provide future broodstock for the westslope cutthroat trout broodstock program.

As of September 30, 1986, the McCall Hatchery was holding 7,250 westslope cutthroat trout fry for release back into Fish Lake in October 1986.

MOUNTAIN LAKES

McCall Hatchery stocks approximately 600 mountain lakes in Regions 1, 2, and 3 on a three-year rotation basis. Lakes in the Boise, Clearwater, Payette, Salmon, and Snake River drainages made up the stocking area. Most of the 115 mountain lakes planted this year were done so by fixed-wing aircraft (Cessna 185) equipped with a fish release hopper (Appendix F). Other methods used for mountain lake planting included backpacking, horse packing, and the use of a motorcycle (Table 6). U.S. Forest Service Helitach employees aided in stocking several mountain lakes.

Table 6. Methods employed by the McCall Hatchery for stocking mountain lakes.

Fixed wing (Cessna 185)	72
USFS helicopter	26
Backpack (hatchery staff)	10
Backpack (Boy Scouts)	³
Horse pack	²
Motorcycle	<u>2</u>
TOTAL	115

Three species of fish were planted by the hatchery staff: rainbow trout, westslope cutthroat trout, and grayling. Approximately 126,750 fry weighing 98.04 pounds were stocked in mountain lakes during 1986 (Table 7).

All mountain lake stocking requests were met in 1986 with few exceptions. Eight lakes within the Gospel Hump Wilderness Area were not planted after a U.S. Forest Service request (Appendix G). Future plantings within the Gospel Hump Wilderness Area are to be discontinued until the U.S. Forest Service develops a fisheries management plan for the area.

The 2 lakes not planted due to shallowness were Frog Lake (07-00-00-0184) and Three Lakes #6 (06-00-00-0602). Finally, Belvidere Lake 12 (07-00-00-0719) was planted with 1,000 westslope cutthroat trout fry by mistake when the pilot mistook it for another lake.

Table 7. Number of mountain lakes stocked, number stocked, and pounds stocked by species by the McCall Hatchery in 1986.

Species	Number lakes stocked	Number stocked	Pounds stocked
Westslope cutthroat trout	82	93,250	72.70
Rainbow trout	29	22,500	23.04
Grayling	<u>4</u>	<u>11,000</u>	<u>2.30</u>
TOTALS	115	126,750	98.04

Observations

On several fish plants, especially backpack plants, specific information concerning fish survival in milk bags was collected. Loading rates, time in the bags, fish condition, and bag water temperature were monitored (Appendix H). It appears that loading rates of one pound or less produced better conditions for survival. At these loading rates, rainbow trout seem to endure up to seven hours in a bag, while westslope cutthroat trout can only handle about five hours in a bag and still come out in good condition. Mortality under these conditions was very low.

Costs

Stocking by fixed-wing aircraft began on July 28 and concluded on August 7, 1986. Five flights were made requiring 13 hours and 9 minutes of flight time and costing \$1,972.50. Seventy-two mountain lakes were planted by fixed-wing aircraft at a cost of \$27.40 per lake for flight time.

After adding personnel costs, the cost per lake stocked by fixed-wing aircraft was \$28.96 (Appendix I).

Backpacking, horse packing, motorcycles, and helicopters were used as alternative methods for stocking mountain lakes by the McCall Hatchery during 1986. The overall average cost for stocking mountain lakes using alternative methods was \$13.50 per lake. The cost per lake planted by alternative methods, not including the use of the U.S. Forest Service helicopter, was \$28.96, the same as the total cost for stocking mountain lakes by fixed-wing aircraft.

Advantages to using alternative methods, such as backpacking, horse packing, and motorcycles, are as follows:

1. Opportunity to temper the fish before planting.
2. Plant fish in the littoral zone providing cover for them.
3. Opportunity to survey the lake and note the extent of littoral zone, inlets and outlets, fish rising, and amount of lake use.

CATCHABLES

The McCall Hatchery is a redistribution station for stocking catchable size rainbow trout for waters in Regions 2 and 3. During 1986, the McCall Hatchery received 148,495 catchable size rainbow trout that weighed 42,775 pounds from the American Falls and Grace hatcheries (Table 8). Forty-four streams, lakes, and reservoirs were stocked (Appendix J). A total of 139,587 catchable size rainbow trout weighing 39,494 pounds were stocked during 1986 (Table 9). The average size of the fish stocked was 3.53 fish per pound.

Table 8. Catchable **size** rainbow trout received by the McCall Hatchery during 1986.

Number	Pounds	pound	Number/ received from
107,375	33,175	3.24	American Falls
41,120	<u>9,600</u>	<u>4.28</u>	Grace
148,495	42,775	3.47	TOTALS

Catchable size rainbow trout were held in an outside collection basin (15 ft. x 110 ft.) prior to redistribution.

Table 9. Catchable size rainbow trout planted by the McCall Hatchery during 1986 (by month).

Month	Number	Pounds	Number Pounds
May	37,020	9,563	3.87
June	26,105	8,101	3.22
July	60,130	16,812	3.58
August	11,268	3,542	3.18
September	5,019	1,476	3.40

Mortality was approximately 1,560 fish while they were being held at the McCall Hatchery, most of which appeared soon after a shipment was received. Several ospreys were seen utilizing the catchables as an easy meal.

HATCHERY STAFF

During Fish Year 1986, the McCall Hatchery experienced a complete personnel change. Tom Frew replaced Bill Hutchinson as the Hatchery Superintendent II. Christopher Starr took over as the new Hatchery Superintendent I when David Parrish took a similar position at the Nampa Hatchery. Robert Hill became the new Fish Culturist when Bob Esselman moved to Eagle to take over as Hatchery Superintendent of the Eagle Hatchery.

Bio-aides and laborers at the McCall Hatchery were John Gebhards, Gregg Dunphy, Craig Hoover, Dan Averill, Will Young, Bob Poertner, and Stan Bercovitz. A Youth Conservation Corps crew spent 8 weeks at the McCall Hatchery during 1986.

ACKNOWLEDGEMENTS

Thanks to Regional biologists Dick Scully and Don Anderson for their help with the Fish Lake Management Plan and all the work that has gone into it this year.

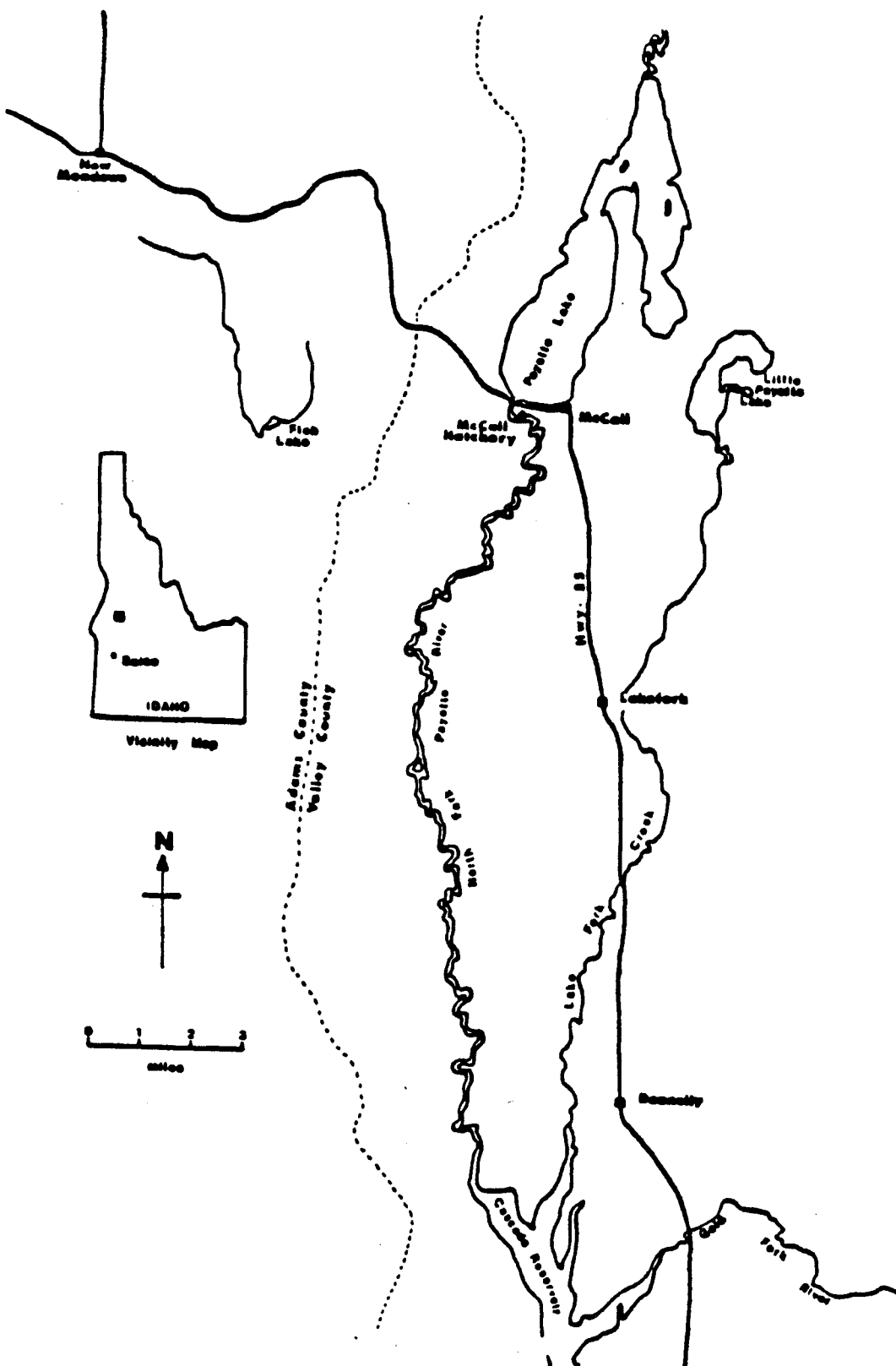
We also wish to thank Walt Arms and Ed Bottum, Conservation officers, for their help in planting several mountain lakes in the area.

Fred Edwards helped out with catchable size rainbow trout planting in the Weiser River drainage.

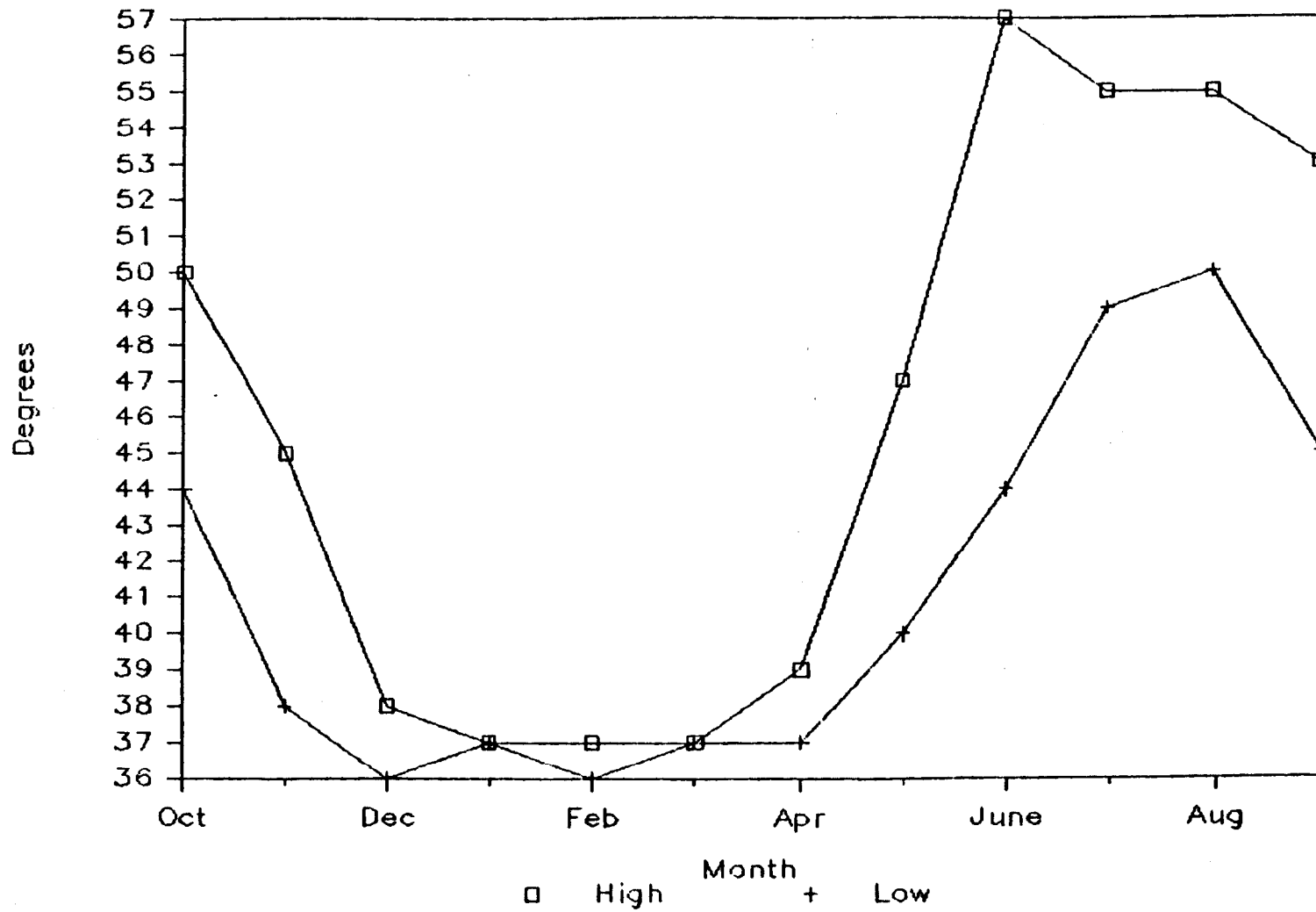
Finally, a thank you goes to Jerry Lockhart, District Conservation Officer, who contributed countless hours with the Fish Lake spawning operation and pointed out planting sites for the catchable size rainbow trout.

APPENDICES

Appendix A. Location of McCall Hatchery.



Monthly Water Temperatures



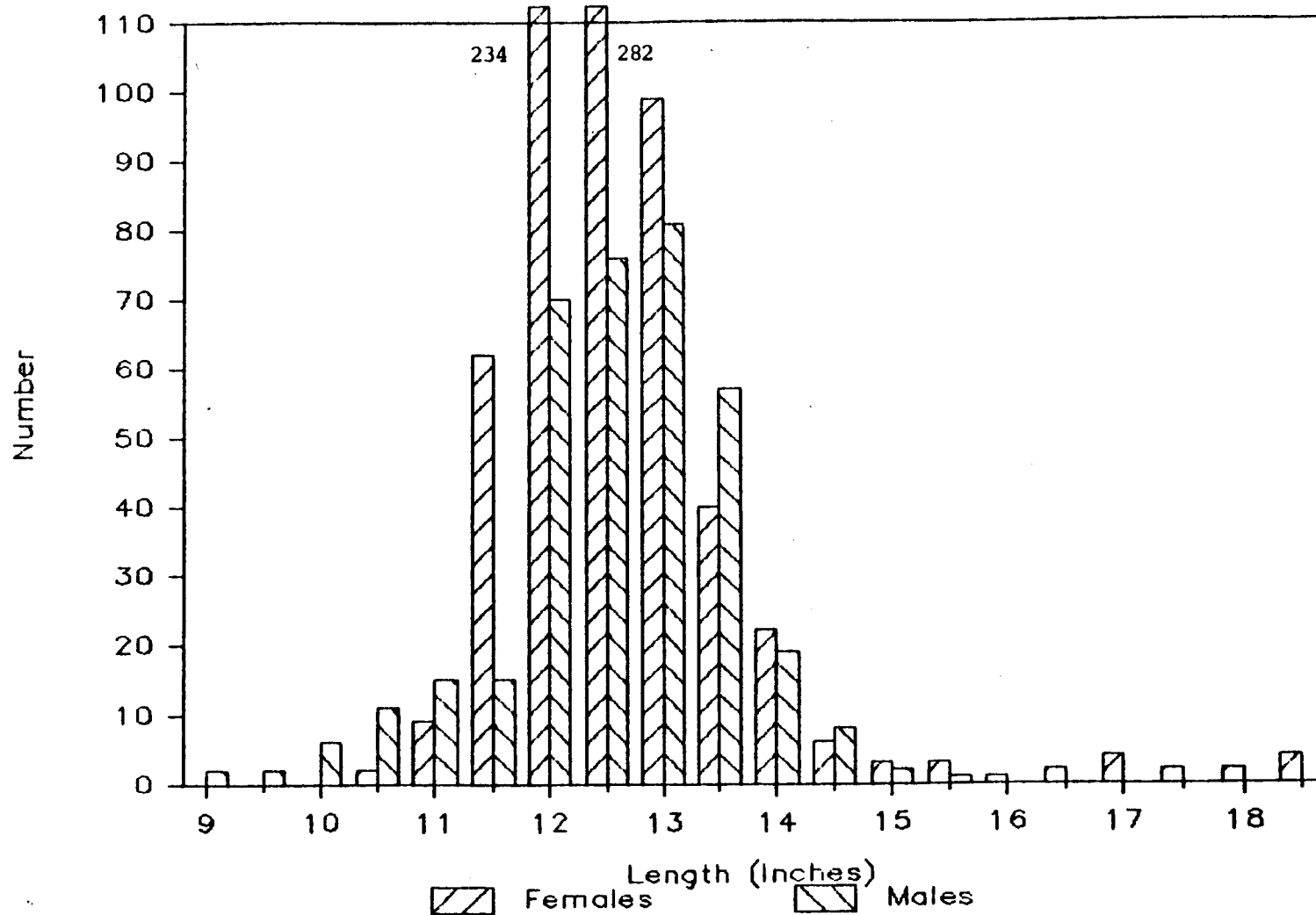
Appendix B. Monthly water temperature ranges at the McCall Hatchery during Fish Year 1986.

Appendix B. Continued.

Month	Monthly water temperatures	
	High	Low
October	50	44
November	45	38
December	38	36
January	37	37
February	37	36
March	37	37
April	39	37
May	47	40
June	57	44
July	55	49
August	55	50
September	53	45

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WESTSLOPE CUTTHROAT TROUT

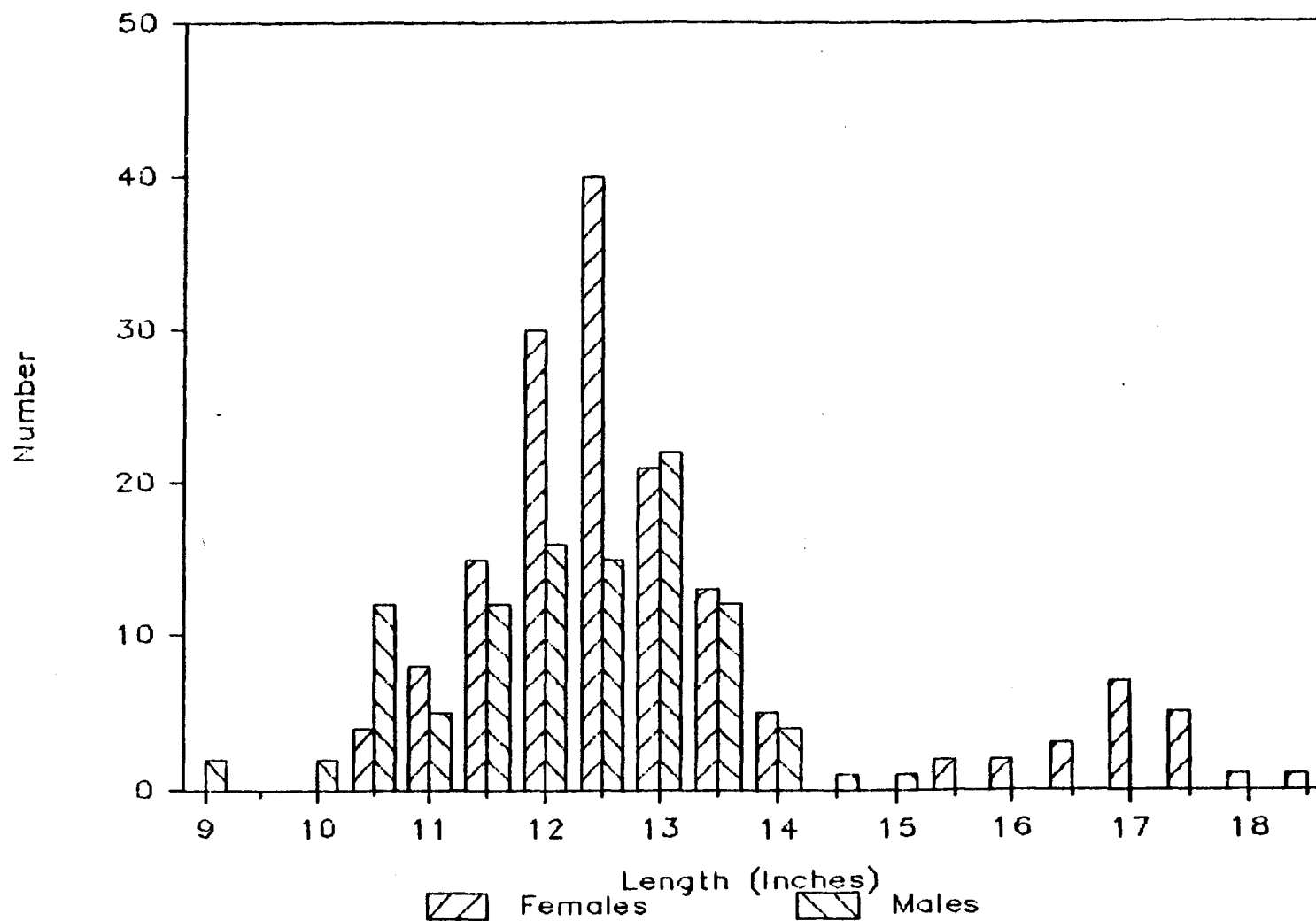


Appendix C. Length frequencies of fish spawned at Fish Lake in 1986.

Appendix C. Continued.

Length (inches)	Number females	Number males
9	0	2
9.5	0	0
10	0	2
10.5	4	12
11	8	5
11.5	15	12
12	30	16
12.5	40	15
13	21	22
13.5	13	12
14	5	4
14.5	0	1
15	0	1
15.5	2	0
16	2	0
16.5	3	0
17	7	0
17.5	5	0
18	1	0
18.5	1	0

WESTSLOPE CUTTHROAT TROUT CULLS



Appendix C. Continued.

Appendix D. A feed cost breakdown by size and manufacturer of fish feed used for the resident fish program at the McCall Hatchery during 1986.

Manufacturer and size	Cost/ pound	Pounds	Total cost
Rangen's Soft Moist swim-up	\$0.5431	150.0	\$ 81.47
Rangen's Soft Moist 11	\$0.5431	250.0	135.77
Rangen's Soft Moist 12	\$0.5431	347.4	188.67
Rangen's trout and salmon	\$0.4130	100.0	41.30
starter with TM-50 OMP IV 1/32*	\$0.4737	36.5	17.29
TOTALS		883.9	\$464.50

*Feed used in October 1985.

Appendix E. Number, pounds, and species of trout fry stocked in reservoirs by the McCall Hatchery in 1986.

Reservoir	Number stocke	Pounds stocked	Species
Horsethief	25,000	69.64	Henrys Lake cutthroat trout
Hornet	3,000	8.89	Rainbow trout
Deadwood	122,96	299.06	Henrys Lake cutthroat trout
Deadwood	30,201	47.94	westslope cutthroat trout culls
Goose Lake	49,718	60.75	westslope cutthroat trout

Appendix F. Mountain lakes stocked by the McCall Hatchery in 1986,
including species and numbers.

Lake	Region	Catalog No.	Species	Number
Devil's Club	1	06-00-00-0113	C2	1,000
Big Talk	1	06-00-00-0114	C2	2,500
Larkins	1	06-00-00-0117	C2	3,000
Hero	1	06-00-00-0119	C2	1,000
Northbound	1	06-00-00-0123	C2	3,000
Fawn	1	06-00-00-0126	C2	3,250
Steamboat	1	06-00-00-0131	GR	2,500
Gold	1	06-00-00-0202	C2	2,000
Lower Post Office	2	06-00-00-0253	C2	2,000
Upper Post Office	2	06-00-00-0254	C2	2,000
Hungry	2	06-00-00-0260	R4	2,000
Siah	2	06-00-00-0274	R4	1,000
Parachute	2	06-00-00-0317	R4	2,000
Garnet	2	06-00-00-0318	C2	1,000
North Spruce	2	06-00-00-0329	C2	1,000
South Spruce	2	06-00-00-0330	C2	1,000
North Porphyry	2	06-00-00-0434	C2	1,000
Porphyry	2	06-00-00-0435	C2	1,000
Jeanette	2	06-00-00-0449	C2	1,000
Neck Island	2	06-00-00-0373	C2	1,000
Valhalla	2	06-00-00-0374	C2	1,000
Mecca	2	06-00-00-0383	C2	1,000
Grotto	2	06-00-00-0387	R4	500
Shasta	2	06-00-00-0393	R4	1,000
May	2	06-00-00-0419	C2	1,000
Maple	2	06-00-00-0420	C2	500
Battle	2	06-00-00-0429	R4	1,000
Bitch	2	06-00-00-0466	C2	1,000
Park	2	06-00-00-0494	C2	1,000
Diamond	2	06-00-00-0507	C2	1,000
Canyon Creek 15	2	06-00-00-0533	C2	1,000
Canyon Creek 113	2	06-00-00-0543	C2	2,000
White Cap Creek 134	2	06-00-00-0570	C2	1,000
Three Lakes Creek 15	2	06-00-00-0600	C2	1,000
Emerald	3	06-00-00-0132	R4	1,000
Upper Emerald	3	06-00-00-0133	R4	500
Six Basin 11	3	05-00-00-0135	C2	1,000
Six Basin 12	3	05-00-00-0136	C2	500
Six Basin 13	3	05-00-00-0137	R4	500
Six Basin 14	3	05-00-00-0138	R4	500
Horse Pasture	3	05-00-00-0141	R4	500
Red Mountain	3	07-00-00-0124	C2	1,000

Appendix F. Continued.

Lake	Region	Catalog No.	Species	Number
Ruth	3	07-00-00-0130	R4	1,000
Crystal	3	07-00-00-0138	C2	1,000
Morgan	3	07-00-00-0155	C2	1,000
Coffee Cup	3	07-00-00-0157	C2	1,000
Rainbow	3	07-00-00-0164	R4	1,500
Hard Butte	3	07-00-00-0165	C2	1,000
Granite Hole	3	07-00-00-0175	R4	500
Corral	3	07-00-00-0177	R4	500
Hidden	3	07-00-00-0179	C2	1,000
Neil	3	07-00-00-0190	C2	500
North Creek	3	07-00-00-0227	R4	500
Center	3	07-00-00-0228	C2	1,000
Union	3	07-00-00-0248	C2	1,000
Middle California	3	07-00-00-0250	C2	500
Upper California	3	07-00-00-0253	C2	500
Cooks	3	07-00-00-0278	R4	500
Ditch Creek	3	07-00-00-0323	R4	1,000
T-Sum 11	3	07-00-00-0360	C2	500
Jungle 1	3	07-00-00-0373	C2	500
Enos 14	3	07-00-00-0379	C2	500
Josephine	3	07-00-00-0408	R4	1,000
Curtis	3	07-00-00-0514	C2	1,000
Basin Creek 12	3	07-00-00-0556	C2	1,000
Basin Creek 13	3	07-00-00-0557	C2	500
Butts Creek	3	07-00-00-0583	R4	500
Kitchen Creek 13	3	07-00-00-0588	C2	1,000
Kitchen Creek 16	3	07-00-00-0593	C2	1,000
Hum	3	07-00-00-0364	C2	1,000
Lick	3	07-00-00-0703	C2	2,000
Belvidere 11	3	07-00-00-0718	C2	1,000
Belvidere 12	3	07-00-00-0719	C2	1,000
Belvidere 13	3	07-00-00-0720	C2	1,000
Belvidere 14	3	07-00-00-0723	C2	1,000
Belvidere 17	3	07-00-00-0727	C2	1,000
Norton	3	07-00-00-0855	C2	1,000
Bernard 11	3	07-00-00-1096	C2	1,500
South Fork Fawn Creek	3	09-00-00-0252	R4	500
Blue	3	09-00-00-0256	R4	500
Lost	3	09-00-00-0263	C2	1,000
Hidden	3	09-00-00-0269	C2	500
Shirts	3	09-00-00-0271	R4	500
Raft	3	09-00-00-0276	R4	500
North Fork Kennally Creek	3	09-00-00-0298	R4	500
Summit	3	09-00-00-0313	GR	3,000
Louie	3	09-00-00-0318	C2	500

Appendix F. Continued.

Lake	Region	Catalog No.	Species	Number
Shaw Twin #1	3	09-00-00-0331	R4	500
Shaw Twin #2	3	09-00-00-0332	C2	1,000
Malony	3	09-00-00-0338	GR	3,000
East Fork Lake Fork Creek	3	09-00-00-0342	C2	500
Crystal	3	09-00-00-0351	R4	500
Blackwell	3	09-00-00-0366	R4	500
Buck	3	09-00-00-0368	C2	500
Squaw	3	09-00-00-0370	R4	500
Horton	3	09-00-00-0381	C2	500
Marge	3	09-00-00-0401	GR	3,000
Red Mountain #2	3	09-00-00-0123	C2	1,500
Red Mountain #3	3	09-00-00-0124	C2	1,500
Eight Mile Creek #1	3	09-00-00-0125	C2	1,500
Eight Mile Creek #2	3	09-00-00-0126	C2	1,500
Eight Mile Creek 13	3	09-00-00-0127	C2	1,500
Eight Mile Creek 14	3	09-00-00-0128	C2	1,500
Cat Creek #1	3	09-00-00-0129	C2	1,500
Cat Creek #2	3	09-00-00-0130	C2	1,500
Cat Creek #3	3	09-00-00-0131	C2	1,500
Cat Creek #4	3	09-00-00-0132	C2	1,500
Cat Creek #5	3	09-00-00-0133	C2	1,500
Baron #4	3	09-00-00-0149	C2	1,000
Hideaway	3	10-00-00-0127	C2	500
Big Buck (Twin Sisters)	3	10-00-00-0187	C2	500
Lake Creek	3	10-00-00-0202	C2	1,000
Lynx Creek #1	3	10-00-00-0264	C2	1,000
Herman #1	3	10-00-00-0285	C2	1,000
Arrowhead	3	10-00-00-0316	C2	1,500

Appendix G. Mountain lakes in the Gospel Hump Wilderness Area that were not stocked as allocated due to a request from the U.S. Forest Service.

Lake	Region	Catalog number
Upper Gospel	2	06-00-00-0619
East Gospel	2	06-00-00-0620
Lower Knob	2	06-00-00-0621
Middle Knob	2	06-00-00-0623
Upper Knob	2	06-00-00-0624
Square Mountain	2	06-00-00-0627
Lower Wiseboy	2	06-00-00-0635
Upper Wiseboy	2	06-00-00-0637

Appendix H. Relationships between size and pounds loaded, time, and fish condition while in milk bags before fish planting by the McCall Hatchery in 1986.

Species	Size (f/lb.)	Lb./ bag	Time in bag (hr.)	Bag temp.	Morts.	Fish condition	Lake
GR	6,000	0.500	2.50	12°C	6	Good	Summit
GR	6,000	0.500	4.00	17°C	0	Good	Marge
GR	6,000	0.500	4.50	17°C	6	Good	Maloney
C2	818	1.222	1.00	13°C	0	Good	Shaw #2
C2	818	0.611	1.25	11°C	0	Good	Louie
C2	1,400	0.357	3.00	11°C	3	Good	Hidden
C2	1,225	1.224	3.00	-	10	Fair	Cat Ck 15
C2	1,400	0.714	3.75	12°C	5	Good	Lost
C2	1,268	0.394	7.50	20°C	20	Fair	Buck
C2	1,268	0.394	14.00	21°C	100	Poor	Jungle 11
R4	629	0.799	1.00	13°C	0	Good	Shaw 11
R4	1,050	0.476	2.25	13°C	1	Good	Blue
R4	1,050	0.476	3.50	11°C	0	Good	Shirts
R4	337	0.808	4.00	16°C	1	Good	Hornet*
R4	1,050	0.476	4.25	14°C	5	Good	Fawn Ck
R4	1,050	0.476	4.50	12°C	0	Good	Raft
R4	825	0.606	5.50	17°C	0	Good	Blackwell
R4	1,008	0.500	6.00	23°C	2	Good	Kennally
R4	825	0.606	7.00	19°C	2	Good	Squaw

One bag per lake except Hornet Reservoir, which had 11 bags and only one mortality total.

Appendix I. Cost breakdown for planting mountain lakes: aerial stocking versus alternative methods of stocking by the McCall Hatchery in 1986.

Aerial fish planting	Alternative methods for fish planting
72 lakes	43 lakes
5 flights by hatchery personnel	8 trips by hatchery personnel
\$27.40/lake, flight cost	- - - - -
\$1.56/lake, personnel cost	\$13.50/lake, personnel cost
\$28.96/lake, total cost	\$13.50/lake, total cost ^a
\$75/lake, most expensive flight	\$79.60/lake, most expensive trip
	\$3.40/lake, least expensive trip

^aThe cost per lake planted by alternative methods, not including the use of the U.S. Forest Service helicopter, was \$28.96, the same as the total cost for stocking mountain lakes by fixed-wing aircraft.

Alternative methods for stocking mountain lakes included backpacking, horse packing, the use of a motorcycle, and a helicopter. For safety reasons, no solo backpack fish plants were done in 1986, so personnel costs on these plants reflect wages for two or more hatchery personnel.

Appendix J. Waters planted with catchable-size rainbow trout by the
McCall Hatchery in 1986.

Water	Catalog number
Slate Creek	07-09-00-0000
Skookumchuck Creek	07-08-00-0000
Herrick Reservior	09-00-00-0251
Corral Creek Reservior	09-00-00-0261
Cruzen-Brown Pond	09-00-00-0330
Rowland Pond	09-00-00-0328
Payette Lake	09-00-00-0364
Browns Pond	09-00-00-0363
Granite Lake	09-00-00-0380
Clear Creek	09-14-08-0000
Big Creek	09-14-09-0000
Gold Fork River	09-14-14-0000
Kennally Creek	09-14-14-0001
Lake Fork Creek	09-14-17-0000
North Fork Lake Fork Creek	09-14-17-0005
Middle Fork Weiser River	08-19-00-0000
East Fork Lost Creek	08-26-02-0003
West Fork Weiser River	08-26-00-0000
Hornet Creek	08-22-00-0000
Weiser River	08-00-01-0000
Weiser River	08-00-02-0000
Lost Creek (below reservoir)	08-26-02-0000
Wildhorse River	05-14-00-0000
Crooked River	05-14-09-0000
Bear Creek	05-14-10-0000
Lick Creek	05-14-12-0000
Kimberland Pond	07-00-00-0185
Brundage Reservoir	07-00-00-0187
Goose Lake	07-00-00-0189
Middle Lake	07-00-00-0169
Little River	07-12-00-0000
Boulder	07-12-10-0000
Goose Creek	07-12-13-0000
Lake Creek	07-24-00-0000
Warm Lake	07-00-00-0515
E. Fork S. Fork Salmon River	07-24-13-0000
Johnson Creek	07-24-13-0008
Secesh River	07-24-11-0000
Warren Dredge Ponds	07-00-00-0310
Seven Devil's Lake	07-00-00-0113
Rapid Creek	09-14-14-0002
Lower Boulder Reservoir	09-00-00-0320
North Fork River	09-14-00-0001
North Fork River	09-14-00-0005
North Fork River	04-19-00-0006
North Fork River	09-14-00-0007
Poorman Pond	09-00-00-0322
Lost Valley Reservoir	08-00-00-0112

Submitted by:

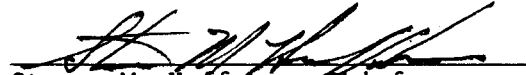
Christopher J. Starr
Hatchery Superintendent I

Approved by:

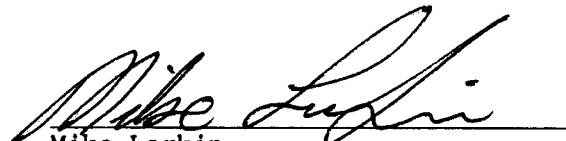
IDAHO DEPARTMENT OF FISH AND GAME



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